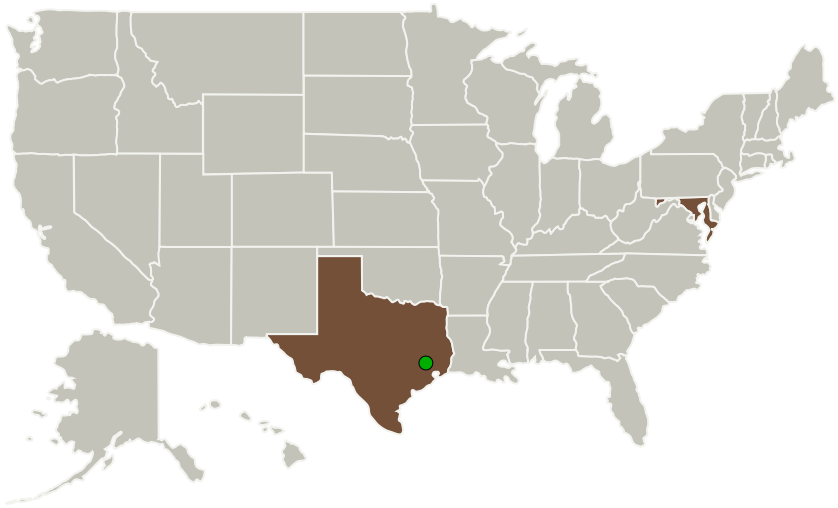
Reconfigurable Power-Aware EVA Radio, Phase I

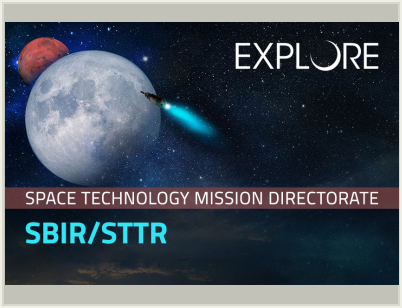
Completed Technology Project (2011 - 2011)

Project Introduction

Advanced Extra Vehicular Activity (EVA) radio system is a pivotal technology for the successful support of the International Space Station beyond 2020 and future human space exploration missions. It facilitates surface operations, enables crew mobility, and supports point to multi-point communications across rovers, Lander, habitat, and other astronauts. Driven by Communications, Command, Control, and Information interoperability, tight power budgets, and extreme miniaturization, this mobile radio platform must be power efficient and highly adaptive. Intelligent Automation, Inc. (IAI) and its sub-contractor, Purdue University, propose to develop a power-efficient, miniaturized, reconfigurable EVA radio system using state-of-the-art RF micro-electromechanical systems (MEMS) and software defined radio (SDR) technologies; and middleware with power aware algorithms. Modern FPGA devices are bridging the gap between high speed digital design and digital signal processor (DSP) implementation. The SDR-based architecture allows the radio to support multiple bandwidth, waveforms and energy profiles; even those developed after the mission began, via cognitive middleware. Therefore, it can lower the mission cost by upgrading the EVA radios when needed. The MEMS tunable filters proposed are based on miniaturized evanescent-mode cavities, which are 95% smaller than conventional cavities and are capable of providing very high Q and excellent tuning range.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Maryland	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138452)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Automation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

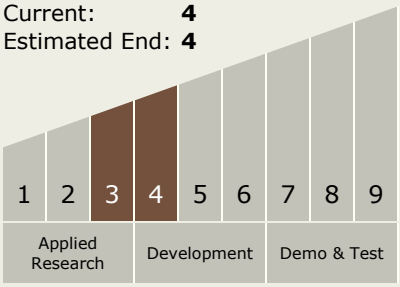
Carlos Torrez

Principal Investigator:

Ali Namazi

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.3 Informatics and Decision Support Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System